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The experience of pain severity and pain interference in Vulvodynia patients: the role of cognitive-behavioural factors, psychological distress and fatigue

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ABSTRACT

Objective: Vulvodynia is a chronic pain condition characterised by severe pain affecting the vulva. Biopsychosocial models have revealed the importance of illness perceptions, cognitive-behavioural variables and psychological distress in explaining the experience of pain and disability across several conditions. These factors have never been collectively examined in Vulvodynia. We predicted that distress, fatigue, illness perceptions, and cognitive-behavioural factors would be associated with pain severity and interference among women with Vulvodynia.

Methods: This online cross-sectional study recruited 335 Vulvodynia patients from an Italian charity association (Vulvodiniapuntoinfo.com), who completed pain severity and interference measures in addition to the Hospital Anxiety and Depression scale, Revised Illness Perception Questionnaire, Chalder Fatigue Questionnaire, Cognitive-Behavioural Symptom Questionnaire and a demographic questionnaire.

Results: Hierarchical regression models controlling for demographic and illness characteristics, revealed that lower treatment control beliefs, greater illness identity, catastrophizing and psychological distress, were significant predictors of pain severity, explaining 35% of the variance. A second adjusted hierarchical regression model revealed that low treatment-control, higher fatigue, distress, and avoidance/resting behaviours were significant predictors of pain interference, explaining 48% of the variance.

Conclusion: Distress, illness perceptions, fatigue, and cognitive-behavioural factors are associated with pain severity and interference in Vulvodynia patients, highlighting the importance of adopting a biopsychosocial approach in this setting. Future research should examine these factors over time to inform the development of future tailored interventions to help support women better manage Vulvodynia.

INTRODUCTION

Vulvodynia is a chronic pain condition characterised by severe vulvar pain lasting more than 3 months, referred to as burning and cutting (knife-like) pain. The prevalence of Vulvodynia is 15-18% (1) with an elusive aetiology (2). According to the International Society for the Study of Vulvovaginal disease (ISSVD) (2), Vulvodynia can be classified as generalised (involving the whole general area), localised in one area such as the Vestibule (Vestibulodynia) or mixed (localised and generalised). This can be further divided by how the pain arises, either spontaneous, provoked (i.e. triggered by a stimulus such as sexual intercourse) or mixed (spontaneous and provoked).

Similar to patients with neuropathic pain conditions, women with Vulvodynia present with allodynia and hyperalgesia (3), therefore dyspareunia and pain occur during normal daily activities. Whilst the aetiology is still unclear, conceivable factors include abnormal inflammatory response in the vestibule and an increased number and superficialization of pain fibers (4,5) due to genetic polymorphisms associated with functional alterations to IL-1β and TNF-α (6), as well as the presence of recurrent infections due to an altered distribution of mannose-binding lectin (7).

Since women with Vulvodynia are faced with severe long-term pain, it is not surprising that it poses multiple challenges for their psychological health. However, there is limited research examining psychological factors associated with Vulvodynia. The lack of research might be partly explained by the fact that Vulvodynia is still conceptualised in a dualistic fashion: either as a psychogenic sexual condition or a biomedical condition. While there is increasing recognition regarding the contribution of psychosocial and behavioural factors in several chronic pain conditions (8,9), a biopsychosocial approach to understanding Vulvodynia has not been widely considered.

Within Vulvodynia, studies have mostly focused on the prevalence of depression and anxiety in this population. The prevalence of psychological distress in women with Vulvodynia has revealed inconsistent findings, with studies suggesting more anxiety and depression compared to healthy women (10,11), and some suggesting no differences (12). The only study to our knowledge investigating the relation between pain and distress (13) suggests an association between depression and the severity of Vulvodynia.

Importantly, while recent advances in other conditions such as chronic lower back pain has identified the importance of catastrophizing, fear and hypervigilance in the aetiology of pain and its maintenance (14,15,16), these factors have not been examined in women with Vulvodynia and only once among Vestibulodynia women (17). According to the fear-avoidance model, pain-catastrophizing leads to fear of pain, resulting in the use of maladaptive coping strategies such as avoidance of activities which may cause pain. Long-term avoidance, however results in deconditioning and lower mood, all factors lowering the threshold at which subsequent pain will be experienced, thus contributing to pain chronicity and exacerbation of catastrophic thoughts. Among Vestibulodynia women, the only study conducted in this domain (17) found that catastrophizing, anxiety, fear of pain, and hypervigilance collectively explained 15% of variance in intercourse pain, but that only pain-catastrophizing contributed unique variance to this outcome. This suggests that whilst pain-catastrophizing is important, other factors might play a role.

Of potential importance is the role of illness perceptions in response to symptoms. However, to date, illness perceptions among women with Vulvodynia have not been evaluated. According to the Common-Sense Model of illness representations (CSM), illness perceptions refer to cognitions that individuals have surrounding an illness or symptom(s) (in the current study perceptions surrounding Vulvodynia), which then guide individuals' coping behaviours to manage and control their conditions (18). Illness perceptions consist of the following

dimensons:1) *identity* (*Beliefs concerning the illness label and symptoms attributed to the condition);* (2) *cause* (beliefs about causes of the illness); (3) *timeline* (the perceived duration of the illness, cyclical, acute or chronic); (4) *consequences* (beliefs about the effects of the illness), (5) *control/cure* (beliefs regarding the controllability/curability of the illness); (6) *coherence* (understanding of the illness). To date, there is robust evidence demonstrating the importance of examining illness perceptions in relation to health outcomes across several conditions (19, 20). For instance, among orofacial pain patients and osteoarthritis patients (21,22), negative illness perceptions at baseline were predictive of higher pain-related disability after 6 months and 6 years respectively, suggesting these could be worth exploring in Vulvodynia.

Biopsychosocial models have been show to explain variability in symptoms across a range of conditions (23,24). For example, Multiple Sclerosis (MS) fatigue (23), is associated with that negative cognitions in responses to fatigue symptoms can lead to negative emotions, which in turn manifest themselves in maladaptive behaviours, such as all-or-nothing (over-exertion followed by excessive rest) and avoidance behaviours, creating a vicious cycle ultimately exacerbating and maintaining fatigue. Within acute and chronic pain conditions fear-avoidance beliefs and distress is associated with greater disability (25). Furthermore, behavioural avoidance has been associated with greater distress and disability amongst those with chronic pain (26). Despite promising findings elsewhere no studies have explored these factors in relation to pain in Vulvodynia patients.

Collectively, the lack of Vulvodynia research requires an urgent need for expansion to give an insight into the contributions of psychological and behavioural factors in women's experience of pain. Furthermore, given the success of tailored psychological interventions on other chronic conditions (27,28), it is of paramount importance to investigate

the contributions of these factors which will help inform the future development of interventions designed to help support women manage their pain.

The overarching objective of this study was to evaluate a biopsychosocial approach in women with Vulvodynia, examining factors associated with the variability of pain severity and interference. Given the findings of past studies investigating the role of psychological and behavioural factors in other long-term conditions we tested the following hypotheses:

1. Psychological distress, as measured by depression and anxiety symptoms, and fatigue would be associated with greater pain severity and interference.

2. Negative illness perceptions, higher levels of catastrophizing, fear-avoidance, damage beliefs, symptoms-focusing, embarrassment-avoidance and greater use of all-or-nothing behaviour and avoidance/resting behaviours would all be associated with greater levels of pain severity and inference.

METHOD

Study Design and procedure

This study employed an online cross-sectional design. The primary outcome variables were self-reported pain severity and pain interference. Participants completed these and other questionnaires (described below) online, using Bristol online Survey (BOS). The study received approval by King's College London committee in June 2016.

Participants

Vulvodynia patients were recruited through media announcements from Vulvoduniapuntoinfo.com, an Italian non-profit organization on Vulvodynia. Participants were considered eligible providing the following: 1) presence of Vulvodynia diagnosis from a health

professional (all subtypes of Vulvodynia were eligible), 2) participants were still suffering from the condition, 3) participants were over 18, 4) participants were fluent in Italian. No upper age limit was set as Vulvodynia can affect women of any age (1). Participants with a comorbid condition were considered eligible. Participants were considered ineligible if the following were present: lack of a Vulvodynia diagnosis from a health professional (2) participants were diagnosed with Vulvodynia in the past but fully recovered, (3) pregnant, (4) insufficient fluency in Italian (5) being under 18.

Materials:

Questionnaires measures- Dependent variables

Pain severity (primary outcome)

Participants' pain severity was assessed through a Numeric Pain Rating Scale (NPRS) consisting of four questions measuring the severity of the pain experienced (29). Each of the following items was rated on a scale where 0 is "no pain" and 10 is "extremely intense pain *(How intense is your pain right now?; How intense was your pain on average last week?; How distressing is your pain right now?; How distressing was your pain on average last week?).* The questionnaire was back-translated. Internal reliability was high (α=.93).

Pain interference (primary outcome)

The Brief-Pain Inventory (interference scale) was used to measure participants' pain interference (30). This scale measures the extent pain interferes with the following aspects of one's life over the course of the past week: general activity, mood, normal work, relationships with people, sleep, enjoyment of life. For each of these domains, a person is asked to choose the rate the degree pain has interfered on a scale from 0 to 10, where 0 is "does not interfere"

and 10 is “completely interferes”. The scale was back-translated and its internal reliability was α=.90.

Questionnaires- Independent variables

Illness Perception Questionnaire-Revised (IPQ-R)

The IPQ-R (31) was used to measure participants' illness perceptions (i.e. Vulvodynia). The IPQ-R measures the following illness representations: *Illness identity* was measured by 14 symptoms in which patients had to report whether they experienced the symptoms and if so whether they attributed the symptom to Vulvodynia. The number of symptoms attributed to Vulvodynia were summed (range 0-14), with higher scores indicating increased illness identity. The following dimensions were measured on a five point likert scale (strongly disagree-strongly agree); *Consequences* (e.g. “my Vulvodynia has major consequences on my life”), *Emotional representations* (e.g. “I get depressed when I think about my Vulvodynia”), *Timeline* (e.g. “my Vulvodynia will last for a long time”), *Cyclical timeline* (e.g. “my Vulvodynia symptoms come and go in cycles”), *Illness coherence* (e.g. “my Vulvodynia is a mystery to me”), *Personal Control* (e.g. “I have the power to influence my Vulvodynia”) *and Treatment Control* (e.g. “my treatment can control my Vulvodynia”). In this study, the Italian version of the IPQ-R was used (32). The internal reliability of each sub-scale was high (αs>.80), with the exceptions of consequences (α= .66) and personal control (α= .60).

Hospital anxiety and depression scale (HADS)

HADS was used to measure participants' psychological distress (depression and anxiety) (33). Due to the high correlation between anxiety and depression sum scales, a total HADS score was computed with high scores representing greater levels of distress. The HADS was back translated and had high internal reliability for the total score (α=.80).

Cognitive-Behavioural Symptom Questionnaire (CBSQ)

The CBSQ (34) is a self-report questionnaire measuring patient's cognitive and behavioural responses to symptoms (in this case *pain*). The CBSQ contains 40-items which are added to form five cognitive subscales; fear avoidance (e.g. "Avoiding unnecessary activities is the safest thing I can do to prevent my symptoms from worsening"), embarrassment avoidance (e.g. "I am embarrassed about my symptoms"), catastrophizing about symptoms (e.g. "I think that if my symptoms get too severe they may never decrease"), beliefs that symptoms signal damage to the body (damage beliefs, e,g. "the severity of my symptoms must mean there is something serious going on in my body"), and symptom focus (e.g. "my symptoms are always at the back of my mind"). There are also two behavioural subscales; resting and avoidance of activity (e.g. "I tend to avoid activities that make my symptoms worse), and all-or-nothing behaviour (e.g. "I tend to overdo things when I feel energetic"). All items are rated on a 5 point Likert scale ranging from "strongly disagree" to "strongly agree". The questionnaire was back-translated and the internal reliabilities of each subscale was acceptable (all αs > .72).

Chalder Fatigue Questionnaire (CFQ)

CFQ (35) was used to measure participants' fatigue. CFQ is an 11-item questionnaire measuring the severity of physical and mental fatigue. Seven items represent physical fatigue (items 1–7) and 4 represent mental fatigue (items 8–11). In this study, binary scoring was used. Each item is scored from "better than usual (0) to "much worse than usual (1)". Scores of the items were added to calculate the total (range=0–11) with scores of 4 indicating high levels ("caseness") of fatigue. The questionnaire was back-translated and had high internal reliability α= .91.

Demographic and clinical data

Demographic and clinical factors were measured through a self-report questionnaire. The questionnaire consists of 20 questions measuring participants' age, nationality, employment status, characteristics of Vulvodynia (e.g. onset, presence of a diagnosis) and details of any physical health comorbidities. The number of comorbidities reported was totalled to form a comorbidity score, where higher scores indicate greater comorbidity.

STATISTICAL METHODS

No data was missing. All data was analysed using SPSS version 22. Factors associated with pain severity and pain interference were evaluated using two multiple linear regression models. Variables were entered in final regression models using a hierarchical method, using a two-block variable entry method. Block 1 adjusted for demographic and clinical factors (level of education, age, years living with diagnosis and comorbidity). The second block included the psychological variables under investigation. The emotional representation variable of the IPQ-R was excluded from the analyses as it overlaps with distress (HADs). Model improvement was evaluated using ΔF-statistic. Improvement in explained variance was calculated using ΔR^2. Statistical significance level was assumed at $p< 0.05$.

RESULTS

Patient characteristics

338 participants took part and provided informed consent. However, 3 patients were removed from the analysis because they lacked a current Vulvodynia diagnosis. A summary of demographic and clinical information is presented in Tables 1 and 2 respectively (n=335). The mean age was 34.8 years (SD=9.6) and predominantly of White ethnic origin (94%). The majority of participants were Italian (96.7%), among which 58% were employed, 18.5% students, and 18.5% unemployed. Participants' mean duration of symptom onset was 6.5 years (Median=

5.0; Interquartile range [IQR]= 5.7), and mean duration since Vulvodynia diagnosis was 3 years (Median= 2.0; IQR= 3.0). 83.6% of participants were on some form of prescribed treatment for the condition. 240 (72%) scored ≥4 on the Chalder fatigue questionnaire indicating clinically significant levels of fatigue.

Demographic and clinical correlates of pain severity and interference

Univariate analyses were conducted examining the associations between demographic, illness-related characteristics with the outcome variables. Age was not significantly correlated with pain severity and interference (r=-.06, p=.269 and r=-.06 and p=.276 respectively). Likewise, years living with the diagnosis was not significantly correlated with pain severity and interference, nor was the number of years living with symptoms. Those with a higher education (university) reported lower pain (mean difference=3.74, p<0.01) and less pain inference (mean difference=5.97, p<0.01) compared to those without a university level education. Greater comorbidity was associated with higher pain (r=.18, p<0.01) and pain interference (r=.24, p<0.01).

Psychological correlates of pain severity and interference

Correlates between psychosocial factors and the outcome variables are shown in Table 3, accompanied by descriptive statistics. All the psychosocial variables, except for cyclical-timeline (with pain severity; r=-.01, p=.818), were significantly correlated with pain severity and pain interference. Pain severity and pain interference correlated strongly (r=.71, p=.001). Correlations between all the psychosocial variables are shown in *appendix Table 1a*.

Multivariate regression: factors associated with pain severity

Psychological factors significantly associated with pain severity, with a correlation of .2 or more were included in the first hierarchical regression model of pain severity. This was

to ensure the model was not over fitted by entering too many independent variables. Therefore, fear-avoidance, all-or-nothing behaviour, timeline (acute/chronic), coherence, cyclical-timeline were excluded from the analysis. The first step in the pain severity model controlled for demographic and illness characteristics, that showed univariate associations with pain severity (Table 4). A higher level of education was found to be a significantly associated with lower pain severity. Furthermore, greater co-morbidity and younger age were associated with higher pain severity. This model was found to explain 6.3% of the variance ($F=3.76$, $p<0.01$). Adding the psychosocial factors into the model significantly improved the model ($F=12.0$, $p<0.01$), explaining an additional 28.3% of the variance in pain severity ($R^2 =.35$). In the fully-adjusted model education and co-morbidity ceased to be significantly associated with pain severity. Higher levels of psychological distress, catastrophizing and illness identity were associated with greater pain severity, while lower levels treatment-control were associated with greater pain severity.

Multivariate regression: factors associated with pain interference

The second hierarchical regression included all the variables significantly correlated with pain interference. The following variables, due to correlation coefficients being <.2, were excluded: timeline (acute/chronic), personal-control, and cyclical-timeline. Block 1, controlled for demographic and illness characteristics, that showed univariate associations with pain interference (Table 5). The model was found to explain 8.4% of variance in pain interference ($F=7.56$, $p<0.01$). Only education and comorbidity were a significantly associated with pain interference. Adding the psychosocial factors into the model significantly improved the model ($F= 17.23$, $p<0.01$), explaining an additional 39.6% of the variance in pain severity ($R^2=.48$). Greater psychological distress, fatigue and avoidance/resting behaviours were

significantly associated with greater pain interference. Lower treatment control was significantly associated with less pain interference.

DISCUSSION

The current study explored the associations between psychological factors and the experience of pain and pan interference among women with Vulvodynia. Among demographic and illness characteristics, education was significantly associated with pain interference in the fully-adjusted model. In agreement with previous research (36), the relationships between education and both outcomes were found to act protectively, with more years of educations being associated with lower pain interference. Age was significantly associated with pain severity, with younger age associated with higher pain severity, which is consistent with previous pain studies (37, 38).

As hypothesised, greater psychological distress was significantly associated with both increased pain severity and interference. The contribution of distress to pain severity and interference has been previously documented in other chronic pain conditions (39), but scarcely researched in Vulvodynia (17). Although speculative, it is possible that psychological distress could constitute a risk-factor for the onset of Vulvodynia, as there is evidence that women with antecedent depression are 4 times more likely to develop Vulvodynia (40). Depression is known to be associated with a lower pain threshold and altered immuno-inflammatory response mechanisms (41,42) which could also be involved in the aetiopathogenesis of Vulvodynia. Examining these relationships would be of interest in future studies to determine whether depression and its association with immune function, are implicated in the aetiology of Vulvodynia.

With regards to illness perceptions, treatment-control was significantly associated with pain severity and interference, with lower perception of treatment-control associated with

higher levels of pain and pain interference. This is consistent with previous findings investigating the role of illness perceptions and clinical outcomes in other populations (43). Whilst causality cannot be inferred here, based on the CSM (*if-then rules* (18), health behaviours such as adherence and lifestyle factors may act as potential mediators. Similarly, high illness identity was significantly associated with greater pain severity. This is consistent with previous research, where a tendency to attribute a wide range of symptoms has been found to be associated with worse health related outcomes among a variety of long-term conditions including, multiple sclerosis (44), rheumatoid arthritis, chronic obstructive pulmonary disease and psoriasis (45) and Fibromyalgia (46). Although the nature of this relationship cannot be examined within the current study, there is evidence that high illness identity is associated with maladaptive coping styles (47), possibly mediating the identity-health outcome relationship.

Lastly, personal-control had a marginal association with pain severity, with lower perceptions of personal control of Vulvodynia being associated with greater pain. The direction of this association is in line with previous research on chronic pain patients such rheumatoid arthritis (48), where lower control was associated with greater pain and disability. However, it should be noted personal control as measured by the IPQ-R, had low internal reliability in the current study limiting the interpretability of its association with the outcome variables. Overall, while the results of the current study support the role of illness representations and distress at explaining pain severity and interference among women with Vulvodynia, not all illness perceptions revealed to be significantly associated with the outcomes, partially confirming this study's hypothesis.

With regards to cognitive-behavioural variables, catastrophizing was the only factor in *adjusted* analysis found to be a significant predictor of pain severity. These findings support past work (17), which has shown an association between catastrophizing and intercourse pain among women with vestibulodynia. Although it is not possible to determine the direction of

causality between catastrophizing and pain given our design, the study suggests the importance of targeting specific pain-related beliefs for the treatment of pain in this patient population and interventions that target catastrophizing (e.g., cognitive restructuring) may be beneficial in women with chronic vulval pain (49). Avoidance/resting behaviour was a significant predictor of pain interference. These findings partially support those of others in other pain conditions (25, 26), and suggest that avoidance of activity is associated with greater pain impact. Longitudinal studies in women with Vulvodynia are needed to examine the temporal relationships between these factors over time.

Lastly, while fatigue was not found to be a significant predictor of pain severity, it was significantly associated with pain interference, where higher levels of fatigue were associated with greater pain interference. Due to the lack of previous research investigating these associations on women with Vulvodynia, this represents the first study to yield these results. While causality cannot be inferred, it is possible that highly interfering pain may lead women to avoid doing activities, to rest more, causing physical deconditioning, and contributing to the experience of fatigue. It is worth exploring the potentially mediating role of rest and avoidance in this population in the future.

Overall, the current study demonstrated that variation in pain and pain interference is associated with distress, illness perceptions and cognitive-behavioural factors. This factors appear to explain greater variance for pain interference than pain severity, suggesting they might be important interventional targets in order to reduce the impact of pain in Vulvodynia.

Strengths and Limitations

Strengths of this study include a large sample, especially in an under-studied population like Vulvodynia. Importantly, the study examined the presence of comorbid-pain conditions in the sample and adjusted for this in the analysis. This is also the first study investigating the role

of fatigue, cognitive-behavioural variables, psychological distress and illness perceptions in relation to pain severity and interference within Vulvodynia. Previous studies within chronic pain (47,50) have demonstrated the contributions of these factors in explaining pain; however, prior to this point no research has sought to explore these factors in this population. In a chronic pain condition like Vulvodynia, which affects 18% of women (1), exploring the patients' beliefs and behaviours surrounding their illness is an important basis for understanding the relations between psychological factors and women's pain. Our results highlight the importance of applying a biopsychosocial approach to understanding pain in Vulvodynia and should encourage longitudinal studies to determine which factors perpetuate and maintain symptoms over time.

Limitations of this study should also be noted. Firstly, the cross-sectional design does not allow to infer conclusions regarding the causality between the predictor and outcome variables. Secondly, although one of the most common and debilitating symptoms of Vulvodynia is intercourse pain, questions regarding this aspect of women's life were not specifically addressed. Therefore, the questionnaires used might have failed to take into account the sexual aspects related to the condition. Further, whilst we used previously validated measurements, these have not been examined within this setting and several of the measures were translated here, possibly impacting upon the reliability of our findings. Clinical information was self-reported which is a further limitation as this could not be verified from medical records. Finally, despite the advantage of a large sample, there was limited external representativeness in regards to ethnicity since the sample was predominantly Caucasian.

Despite the limitations, this study advances understanding of Vulvodynia pain and interference by providing preliminary empirical support for the utility of a biopsychosocial model for understanding pain in this population. This study also suggests that efforts to treat

Vulvodynia from a purely biomedical perspective may be insufficient, and that pain and suffering may be better alleviated by adopting an approach that addresses both physiological causes of pain as well as psychosocial factors.

In summary, the current study suggests an association between psychological and behavioural factors with greater levels of pain severity and interference among women with Vulvodynia. Due to the cross-sectional design of the study, conclusion must be drawn with caution. Nevertheless, such findings have important implications. Incorporating existing empirically supported psychosocial interventions for pain (e.g. cognitive-behavioural therapy) into treatment protocols for Vulvodynia may hold promise for enhancing pain management in this population. Longitudinal studies are first needed to examine the causal pathways between illness perceptions, cognitive-behavioural factors and pain among women with Vulvodynia.

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Table 1: Summary of demographic factors (n=335)

Variable	
Age (years), Mean ± SD (range)	34.8 ± 9.6 (18-65)
Nationality (Italian), *n (*%)	324 (96.7%)
Ethnicity (Caucasian), *n* (%)	315 (94%)
Marital status	
Married, *n* (%)	85 (25.4%)
With partner, *n* (%)	159 (47.5%)
Divorced/separated, *n* (%)	15 (4.5%)
Alone, *n* (%)	75 (22.4%)
Not disclosed, n (%)	1 (0.3%)
Employment status	
Employed, *n* (%)	196 (58.5%)
Student, *n* (%)	62 (18.5%)
Unemployed, *n* (%)	62 (18.5%)
Not disclosed, *n* (%)	15 (4.5%)
Education	
Middle School (8 years of school Education), *n* (%)	14 (4.2%)
High School (13 years of school education), *n* (%)	136 (40.6%)
Higher Education, *n* (%)	185 (55.2%)

Notes. SD= Standard deviation

Table 2: Summary of clinical factors (n=335)

Variable	
Number of years since symptom onset, Mean, median (IQR)	6.5, 5.0 (5.7)
Number of years since diagnosis, Mean, median (IQR)	3, 2.0 (3.0)
Diagnostic Delay (Years)	3.5
Severity of Diagnosis	
Mild, *n* (%)	15 ± (14.5%)
Moderate, *n* (%)	147 ± (43.9%)
Severe, *n* (%)	95 (28.4%)
Not disclosed, *n* (%)	78 (23.3%)
Currently on Treatment, *n (%)*	280 (83.6%)
Pelvic Floor Dysfunction	
Suffering, *n (%)*	219 (65.4%)
Not known, *n (%)*	72 (21.5%)
Comorbidities	
Fibromyalgia, *n* (%)	35 (10.4%)
Irritable Bowel Syndrome, *n* (%)	26 (7.7%)
Endometriosis, *n* (%)	12 (3.5%)
Hypothyroidism, *n* (%)	16 (4.7%)
Interstitial cystitis, *n* (%)	7 (2%)

Notes. SD= standard deviation; IQR= interquartile range

Table 3: Correlations between the independent and outcome variables (Pain severity and Pain interference)

	Mean (S.D)	Pain severity	Pain interference
Pain severity	17.42 (11.72)	-	.71**
Pain Interference	32.29 (19.26)	.71**	-
HADS	18.25 (8.04)	.49**	.62**
CFQ	6.08 (3.93)	.29**	.44**
CBSQ			
Fear-avoidance	13.71 (5.02)	.13*	.30**
Catastrophizing	8.26 (4.07)	*.43***	.47**
Embarrassment-avoidance	11.01 (6.56)	.27**	.39**
All-or-nothing Behaviour	7.34 (5.23)	.17*	.28**
Avoidance/resting Behaviour	11.25 (6.66)	.27**	.44**
Symptom focusing	17.54 (4.71)	.34**	.40**
Damage	12.24 (3.61)	.30**	.31**
IPQ-R			
Identity	3.89(3.02)	.27**	.33**
Acute-chronic timeline	22.54 (3.82)	.16*	.12*
Consequences	23.39 (4.11)	.31**	.40**
Personal control	19.81 (4.35)	-.25**	-.19**
Treatment control	17.13 (3.80)	-.36**	-.32**
Illness Coherence	14.67 (4.91)	-.19**	-.28**
Cyclical timeline	14.58 (3.67)	-.01	.12*
Emotional representation	24.58 (4.62)	.29**	.33**

*Notes. *p<.05; **p<.01 HADS= Hospital Anxiety and Depression Scale; CFQ= Chalder Fatigue questionnaire; CBSQ= Cognitive Behavioural Symptom Questionnaire; IPQ-R= Illness perception Questionnaire Revised*

Table 4: Hierarchical regression model for pain severity

	Block 1		Block 2	
Variable	Beta (s.e)	95% CI	Beta (s.e)	95% CI
Age	-.14 (.70)*	-.28, .00	-.13 (.06)*	-.25, -0.01
Education	-3.69 (1.28)*	-6.21, -1.16	-1.74 (1.31)	-3.96, .49
Years with symptoms	0.03 (0.10)	-.17, .23	.08 (.09)	-.10, .26
Comorbidity	1.78 (.56)**	.69, 2.89	.12 (.52)	-.92, 1.15
Distress			.46 (.10)**	.26, .66
Catastrophizing			40 (.20)*	.01, .78
Fatigue			-.04 (.17)	-.29, .36
EA			-.13 (.10)	-.33, .08
A/R behaviour			.01 (.10)	-.20, .20
Illness Identity			.49 (.22)*	.06, .91
Consequences			.02 (.17)	-.31, 0.36
Personal control			-.27 (.14)[a]	-.56, .01
Treatment control			-.52 (.18)*	-.88, -.16
Damage beliefs			-.04 (.20)	-.43, .34
Symptom focusing			.07 (.16)	-.24, .37

Notes. **p<.05; **p<.01; CI= confidence intervals; SE= standard error; B= unstandardized beta coefficient;* β= standardised beta coefficient; EA= embarrassment-avoidance; A/R Behaviour= avoidance/resting behaviour [a]p=0.06

Table 5: Hierarchical regression for pain interference

	Block 1		Block 2	
Variable	Beta (s.e)	95% CI	Beta (s.e)	95% CI
Age	-.21 (.11)	-.44, .01	-.16 (.09)	-.34, .02
Education	-5.62 (2.08)*	-9.72, -1.52	-2.76 (1.64)	-6.0, .48
Years with symptoms	-.03 (.17)	-.36, .30	.13 (.13)	-.13, .39
Comorbidity	3.98 (.92)**	2.17, 5.78	1.03 (.77)	-.48, 2.55
Distress			.91 (.15)**	.61, 1.21
Catastrophizing			.27 (.29)	-.31, .85
Fatigue			.57 (.25)*	.09, 1.05
Fear-avoidance			.32 (.18)	-.05, .68
Damage			-.37 (.29)	-.95, .21
EA			-.05 (.16)	-.36, .27
Symptom focusing			.12 (.23)	-.34, .58
A/N Behaviour			-.05 (.18)	-.41, .30
A/R behaviour			.37 (16)*	.05, .69
Illness Identity			.37 (.32)	-.25, .1.0
Consequences			.05 (.25)	-.44, .54
Treatment control			-.59 (.26)*	-1.10, -.08
Illness Coherence			-.26 (.19)	-.63, .12

*Notes. *p<0.05; **p<0.01; CI= confidence intervals; SE= standard error; B= unstandardized beta coefficient; β= standardised beta coefficient; A/R behaviour= avoidance-resting behaviour*